

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 1 308 956 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
07.05.2003 Bulletin 2003/19

(51) Int Cl.7: **G11B 27/10**

(21) Application number: **02257316.6**

(22) Date of filing: **22.10.2002**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
IE IT LI LU MC NL PT SE SK TR**
Designated Extension States:
AL LT LV MK RO SI

(72) Inventors:
• **Chung, Hyun-kwon**
Gwangju-gun, Gyeonggi-do (KR)
• **Ko, Jung-wan**
Suwon-si, Gyeonggi-do (KR)

(30) Priority: **23.10.2001 KR 2001065391**
12.01.2002 KR 2002001887
17.05.2002 KR 2002027341
24.09.2002 KR 2002057813

(74) Representative: **Robinson, Ian Michael et al**
Appleyard Lees,
15 Clare Road
Halifax HX1 2HY (GB)

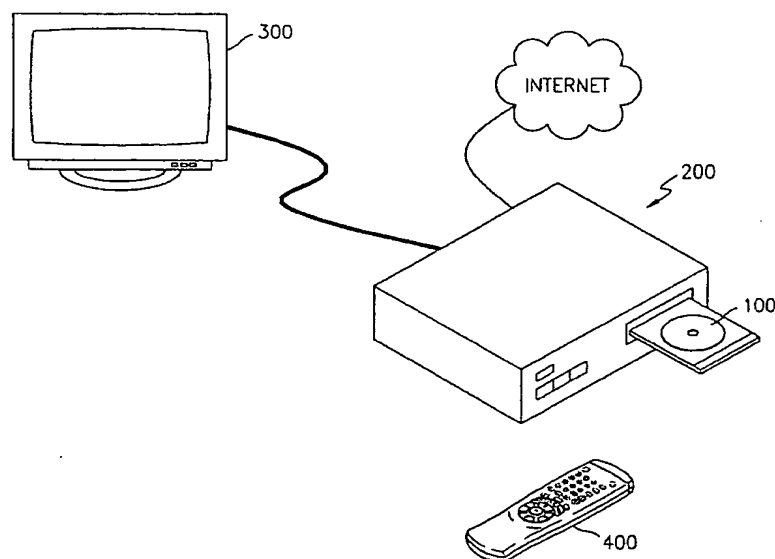
(71) Applicant: **SAMSUNG ELECTRONICS CO., LTD.**
Suwon-City, Kyungki-do (KR)

(54) **Method and apparatus for reproducing contents from information storage medium in interactive mode**

(57) A method and apparatus for reproducing in an interactive mode are provided. The method of reproducing content (e.g. A/V data) from an information storage medium (e.g. DVD disc 100) in an interactive mode includes receiving or reading information, which is necessary for reproducing the content in the interactive mode,

from Internet or the information storage medium; and reproducing the content in the interactive mode based on a combination of the received or read information. Accordingly, even if the information for reproducing the content in the interactive mode is not recorded on the information storage medium, the content can still be reproduced in the interactive mode.

FIG. 1



EP 1 308 956 A1

Description

[0001] The present invention relates to a method and apparatus for reproducing contents, which are recorded on an image storage medium, in an interactive mode.

[0002] There have been proposed interactive digital versatile discs (DVDs) from which contents can be reproduced in an interactive mode based on a personal computer (PC). Interactive DVDs are DVDs on which a markup document is recorded together with audio/video (AV) data. The AV data can be reproduced from interactive DVDs in two kinds of modes: a video mode in which the AV data is displayed in the same manner as AV data is reproduced from normal DVDs, and an interactive mode in which reproduced AV data is displayed on a display window that is defined by a markup document. A display screen displayed in the interactive mode is referred to as an interactive screen.

[0003] When a user selects an interactive mode, a browser installed in a PC interprets and displays a markup document that is recorded on an interactive DVD. AV data selected by the user is displayed on a display window defined by a markup document. A representative markup document is a HyperText Markup Language (HTML) document. For example, when AV data is a movie, a moving picture is displayed on an HTML display window in the markup document, and additional information, such as a script, a synopsis, or pictures of actors and actresses, about the movie may be displayed on the remaining area of the markup document. Additional information may be displayed in synchronization with a title (i.e., AV data). For example, when a particular actor or actress appears, a markup document containing his/her background information is called and displayed.

[0004] However, since information for supporting an interactive function is not recorded on a conventional DVD-video, AV data recorded on the DVD-video cannot be reproduced in an interactive mode. In other words, contents that are recorded on an information storage medium, on which information for supporting an interactive function is not recorded, cannot be reproduced in an interactive mode. Moreover, even if a disc supports the interactive mode, content displayed on an interactive screen cannot be updated.

[0005] It is an aim of the present invention to provide a method and apparatus for reproducing contents from an information storage medium, in an interactive mode, even when information necessary for reproducing the contents in an interactive mode is not recorded on the information storage medium itself.

[0006] Another aim of at least preferred embodiments of the present invention is to provide a method and apparatus for reproducing contents from a disc, which does not support an interactive function, in an interactive mode.

[0007] Another aim of the preferred embodiments of the present invention is to provide a method and apparatus for updating content that is displayed on a markup document screen during reproduction of the content in an interactive mode.

[0008] Yet another aim of at least preferred embodiments of the present invention is to provide a method and apparatus for reading text data information linked to a markup document during reproducing in an interactive mode.

[0009] According to the present invention there is provided a method and apparatus as set forth in the appended claims. Preferred features of the method and apparatus will be apparent from the dependent claims, and the description which follows.

[0010] In one aspect of the present invention there is provided a method of reproducing content from an information storage medium in an interactive mode. The method includes the steps of (a) receiving information, which is necessary for reproducing the content in the interactive mode, from Internet or reading the information from the information storage medium; and (b) reproducing the content in the interactive mode based on the received or read information.

[0011] Preferably, the step (a) includes the steps of (a1): determining whether the information for reproducing the content in the interactive mode has been recorded on the information storage medium; and (a2) requesting and receiving the information from a predetermined server apparatus when it is determined that the information has not been recorded on the information storage medium.

[0012] Preferably, the step (a2) includes the steps of: (a21) transmitting an identifier of the content to the server apparatus; and (a22) receiving at least one among a reproducing control file and a markup document, which correspond to the identifier from the server apparatus.

[0013] Also according to the present invention there is provided a method of reproducing a video title from a disc in an interactive mode. The method includes the steps of: (a) requesting and receiving information, which is necessary for reproducing the video title in the interactive mode, from Internet; and (b) reproducing the video title in the interactive mode based on the received information.

[0014] Preferably, the step (a) includes the step of (a1) requesting and receiving a reproducing control file and a markup document, which are necessary for reproducing the video title in the interactive mode. Preferably, the step (a1) includes the steps of: (a11) transmitting an identifier of the video title to the server apparatus; and (a12) receiving the reproducing control file and the markup document which correspond to the identifier. Preferably, the step (a11) includes receiving a markup document, which contains a client execution code for recognizing the identifier of the video title, from the server apparatus.

[0015] Preferably, the step (a12) includes the steps of: (a121) receiving the markup document for downloading the

reproducing control file; and (a122) reading the position of the reproducing control file that is linked to the markup document received in step (a121) and receiving the reproducing control file.

[0016] Preferably, the markup document received in step (a121) contains either a link tag that is linked to the reproducing control file or an execution code that calls application program interface (API) for download of the reproducing control file. The link tag may be used to retrieve text data. Preferably, the reproducing control file contains designation information designating that the reproducing control file is made for the purpose of reproducing control.

[0017] In a second aspect of the present invention there is provided an apparatus for reproducing content from an information storage medium in an interactive mode. The apparatus includes: a reader that reads the content from the information storage medium; a decoder that decodes the read content; and a network data transceiver that transmits and receives information, which is necessary for reproducing the content in the interactive mode, to and from the outside through Internet. The apparatus reproduces the content in the interactive mode using the information, which is necessary for reproducing the content in the interactive mode and is read from the information storage medium or received through the network data transceiver.

[0018] Preferably, the information necessary for reproducing in the interactive mode includes a reproducing control file for reproducing the content and a markup document that is displayed together with the content. The apparatus further includes a presentation engine that analyzes the reproducing control file and the markup document to perform or reproduce them; and a blender that blends the decoded content and the reproduced markup document.

[0019] The network data transceiver transmits an identifier of the content to a server apparatus and receives interactive content corresponding to the identifier from the server apparatus.

[0020] Also according to the second aspect of the present invention there is provided an apparatus for reproducing a video title from a disc in an interactive mode. The apparatus includes a network data transceiver that requests and receives information, which is necessary for reproducing the video title in the interactive mode, from Internet, wherein the video title is reproduced in the interactive mode based on the received information.

[0021] Preferably, the network data transceiver requests and receives a reproducing control file and a markup document, which are necessary for reproducing the video title in the interactive mode, from the server apparatus.

[0022] For a better understanding of the invention, and to show how embodiments of the same may be carried into effect, reference will now be made, by way of example, to the accompanying diagrammatic drawings in which:

Figure 1 is a schematic diagram of a reproducing system according to a preferred embodiment of the present invention;

Figure 2 is a block diagram of the reproducing apparatus shown in Figure 1;

Figure 3 shows an example of the remote controller shown in Figure 1;

Figure 4 shows an example of a directory structure of a disc which supports an interactive mode;

Figure 5 is a schematic diagram explaining a procedure for reproducing contents from a disc which supports an interactive mode;

Figure 6 shows an example of a directory structure of a disc which does not support an interactive mode;

Figure 7 is a schematic diagram explaining a procedure for reproducing contents in an interactive mode from a disc, which does not support the interactive mode;

Figure 8 is a schematic diagram explaining a method of updating content displayed on an interactive mode reproducing screen;

Figure 9 is a flowchart of a reproducing method according to an embodiment of the present invention; and

Figure 10 is a flowchart of a reproducing method according to another embodiment of the present invention.

[0023] Hereinafter, preferred embodiments of the present invention will be described in detail with reference to the attached drawings. In this specification, a "markup document" generally indicates a document which is written in a markup language such as an extensible markup language (XML) or a standard generalized markup language (SGML); a source code which is written in a script language (e.g., Java script) or an execution code (e.g., Java applet); or a document which is linked to an execution code or in which an execution code is embedded. Furthermore, the "markup document" means any file, which is embedded in a markup document and used for image display. In other words, a

markup document is a kind of application which is necessary for reproducing audio/video (AV) data in an interactive mode. An "interactive screen" is a screen that is displayed during reproducing in an interactive mode. In the interactive screen, an AV screen is embedded in a markup document screen. The "AV screen" indicates a screen on which AV data is reproduced and displayed so that a user can visually perceive the AV data. The "markup document screen" indicates a screen on which a markup document is reproduced and displayed so that a user can visually perceive the markup document.

[0024] A reproducing apparatus of the present invention can reproduce contents in an interactive mode from a disc of the present invention regardless of whether or not the disc supports the interactive mode. Furthermore, the reproducing apparatus of the present invention can update content on a markup document screen that is displayed together with contents recorded on the disc.

[0025] Figure 1 is a schematic diagram of a reproducing system according to a preferred embodiment of the present invention. Referring to Figure 1, the reproducing system includes a disc 100, a reproducing apparatus 200, a television (TV) 300, i.e., a display unit according to the embodiment of the present invention, and a remote controller 400. The remote controller 400 transmits a control command input by a user to the reproducing apparatus 200. When information necessary for reproducing in an interactive mode is not recorded on the disc 100, in response to the user's control command, the reproducing apparatus 200 accesses Internet, downloads necessary information, reproduces relevant contents in the interactive mode, and transmits the reproduced contents to the TV 300. In addition, according to a user's control command, the reproducing apparatus 200 accesses the Internet and downloads the new version of the contents recorded on the disc 100. The TV 300 displays contents and/or information that is received from the reproducing apparatus 200.

[0026] Figure 2 is a block diagram of the reproducing apparatus 200 shown in Figure 1. Referring to Figure 2, the reproducing apparatus 200 includes a reader 1, a buffer memory 2, a cache memory 3, a decoder 4, a presentation engine 5, a network data transceiver 6, and a blender 7.

[0027] The reader 1 reads data from the disc 100, i.e., a digital versatile disc (DVD), according to the present invention. The buffer memory 2 buffers the AV data read by the reader 1. The cache memory 3 caches a markup document which is either read by the reader 1 or downloaded from the Internet by the network data transceiver 6. The presentation engine 5 interprets a markup document, which is read from the cache memory 3, to check the position of a display window and display an AV data stream, which is output from the decoder 4, on the display window. The network data transceiver 6 downloads information necessary for reproducing in the interactive mode, a reproducing control file, and a markup document from the Internet when the disc 100 does not support the interactive mode. The blender 7 blends decoded AV data and a markup document and outputs the result of blending to the TV 300.

[0028] Figure 3 shows an example of the remote controller 400 shown in Figure 1. Referring to Figure 3, the remote controller 400 includes a variety of functional buttons. A TV button 41 is used for externally receiving broadcast signals to watch external broadcast programs through the TV 300. A DVD button 42 is used to view AV data, which is provided from the reproducing apparatus 200, through the TV 300. A numeral/character button group 43 for selecting a channel number is disposed in the upper front portion of the remote controller 400. A Setup 44 denotes a button for calling an On Screen Display (OSD) menu to set up the reproducing apparatus 200. An H/E 45 denotes a language conversion button. An SP 46 denotes a space button, and a DEL 47 denotes a delete button. A Screen Mode 48 denotes a button for converting a display mode on a screen, a Menu 49 denotes a button for calling a menu screen, and a Content Info 50 denotes a button for downloading predetermined information from the Internet. Reference numeral 52 denotes a group of direction keys for moving highlight information which is displayed on the display screen of the TV 300. An Enter 51 denotes a button for selecting a menu at which highlight information is positioned. When a video title is reproduced, a user can convert the language of audio using an Audio 53, convert the language of a caption using a Sub title 54, and convert the angle of a screen using an Angle 55. A Focus change 58 is used for moving current highlight information on the display screen. A Return 58 is used for movement between levels in a menu having a hierarchical structure. An Exit 56 is a button for moving from the menu screen to a video title reproducing screen. The remote controller 400 shown in Figure 3 is an example which is provided for the DVD 100 on which a video title is recorded. Accordingly, specific functional buttons and the number of the buttons may be changed. In addition, some of the functional buttons may be placed into the OSD menu. On the contrary, some of the OSD menu may be manifested as functional buttons.

[0029] Figure 4 shows an example of a directory structure of a disc which supports an interactive mode. Referring to Figure 4, a root directory includes a video directory VIDEO_TS containing AV data. In the video directory VIDEO_TS is disposed a file VIDEO_TS.IFO which contains information for controlling reproducing all video titles. Language information that is set to a default value for the video title is recorded in the file VIDEO_TS.IFO. Behind the file VIDEO_TS.IFO is recorded a file VTS_01_0.IFO, which contains information for controlling reproducing a first video title set, and files VTS_01_0.VOB and VTS_01_1.VOB, which constitute the first video title set. The files VTS_01_0.VOB and VTS_01_1.VOB are video titles, i.e., video objects which constitute the first video title set. Each of the files VTS_01_0.VOB and VTS_01_1.VOB includes a video object unit (VOBU) which is composed of a navigation pack, a

video pack, and an audio pack. The more detailed configuration of the VOB is disclosed in a DVD-Video specification "DVD-Video for Read Only Memory Disc 1.0".

[0030] The root directory also includes an interactive directory DVD_ENAV which stores information for supporting an interactive mode. A reproducing control file DVD_ENAV.IFO is recorded in the interactive directory DVD_ENAV. For example, in the reproducing control file DVD_ENAV.IFO are recorded the definition and configuration of a relevant directory, the number of titles included in the directory, basic information about each title, information about language used in each title, reproducing control information which can replace VIDEO_TS.IFO and VTS_01_0.IFO for each title, information about caption and font, markup document display information such as resolution and color, a copyright information, and text data information produced and inserted by a content provider. For the copyright information, an International Standard Recording Code (ISRC) may be recorded. The ISRC is an international standard code used to identify music, songs, and music video and is granted by the Recording Industry Association of America (RIAA). The ISRC may be used as a video title identifier. The text data information may have a predetermined text data configuration and may be provided with predetermined application program interface API for searching text data. For example, a text data configuration proposed in Korean Patent Application No. 2001-0065392 may be used. Furthermore, in the interactive directory DVD_ENAV may be stored an initial startup markup document INDEX.XML which is displayed together with a video title or other markup documents. In addition, a file which is to be inserted into and displayed together with a markup document may be stored in the interactive directory DVD_ENAV.

[0031] In the meantime, a burst cutting area (BCA) code may be recorded on the back of a disc. The BCA code is recorded on a disc along the inner circumference in the form of a bar code in order to protect a copyright. The BCA code may be used as a disc identifier. A code (e.g., universal product code (UPC)) may be recorded as a disc identifier or a video title identifier in a different position than the BCA code and the ISRC code.

[0032] Figure 5 is a schematic diagram explaining a procedure for reproducing contents from a disc which supports an interactive mode. Referring to Figure 5, when a user insert an interactive disc into a reproducing apparatus according to the present invention, the reproducing apparatus reads the reproducing control file DVD_ENAV.IFO from the disc, analyzes the reproducing control file DVD_ENAV.IFO, and reads the initial startup markup document INDEX.XML. If the initial startup markup document INDEX.XML is linked to the reproducing control file DVD_ENAV.IFO, the reproducing apparatus reproduces a relevant video title in an interactive mode based on the link. Thus, in a state shown in Figure 5(a) in which nothing is displayed, an AV screen displaying a video title and a markup document screen displaying a markup document are simultaneously displayed in an interactive mode, as shown in Figure 5(c).

[0033] The following is an example of the initial startup markup document INDEX.XML that is read from the disc 100.

```

5  <?xml version="1.0"?>
   <!DOCTYPE html PUBLIC "-//DVD//DTD XHTML DVD-HTML 1.0//EN
   "http://www.dvdforum.org/enav/dtd/dvdhtml-1-0.dtd">
   <html>
   <head>
   <title> startup markup document</title>
10  <link rel="stylesheet" type="text/css" href="starwars.css" />
   <link rel="dvd-xifo" type="application/dvd-xifo"
   href="dvd://dvd_enav/dvd_enav.i fo" id="xifo"/>
   <script type="text/ecmascript">
15  <!--
   function load_handler()
   { //set IDCD(=1000) to 'testing' control.
     xifo.FindTextData(1000);
     textinp.value = xifo.TextData:
20   }
   -->
   </script>
   </head>
25  <body onload="load_handler()" background="url(dvd:)">
   <script type="text/ecmascript">
   <!--
     dvdVideo.Play();
   -->
30   <p>input text:<input type="text" name="inputtxt" value="" id="textinp"></p>
   </script>
   </body>
   </html>
35

```

[0034] In the above source code, <link rel="dvd-xifo" type="application/dvd-xifo" href="dvd://dvd_enav/dvd_enav.i fo" id="xifo"/> instructs to reproduce a relevant video title based on the file DVD_ENAV.IFO recorded on the disc 100. In addition, this link tag provides a method of bringing text data within the file DVD_ENAV.IFO. For example, "xifo.FindTextData(1000):" in the above source code instructs to find a text item for which the IDCD of the file DVD_ENAV.IFO is 1000 and bring the text item to xifo.TextData. Data stored in the xifo.TextData may be read in the manner of x = xifo.TextData. By using this method for reading text data, a plurality of reproducing control files can be linked to a markup document. The following is an interface structure for script language for dealing with text data linked to an element of a link tag.

```

50  Interface LinkTextData{
     DOMString TextData;
     unsigned long TextDataIDCD;
     boolean FindTextData(unsigned long IDCD);
     boolean FindPrevTextData(long n);
55  boolean FindNextTextData(long n);
     }

```

[0035] Accordingly, if an identifier code that is the same as an identifier code of text data, which is desired to be found using a link tag, is found in the file DVD_ENAV.IFO, a start address of a relevant item text is found and the text data is retrieved, or text data, which is recorded at an n-th place either before or behind a position where text data that was found previously is recorded, can be retrieved.

5 [0036] Figure 6 shows an example of a directory structure of a disc which does not support an interactive mode. Referring to Figure 6, a root directory includes a video directory VIDEO_TS containing AV data. The video directory VIDEO_TS is provided with a file VIDEO_TS.IFO which contains information for controlling reproducing each video title recorded on a disc. An identifier of a disc or video title is recorded in the file VIDEO_TS.IFO. The remaining data configuration is the same as that shown in Figure 4, and thus description thereof will be omitted.

10 [0037] The root directory shown in Figure 6 does not include an interactive directory which stores information for supporting an interactive mode. In other words, the reproducing control file DVD_ENAV.IFO and the initial startup markup document INDEX.XML are not stored in the disc.

[0038] Figure 7 is a schematic diagram explaining a procedure for reproducing contents in an interactive mode from a disc that does not support the interactive mode. Referring to Figure 7, when a user inserts a normal disc into a reproducing apparatus according to the present invention, the reproducing apparatus reproduces a video title recorded on the disc in a video mode. Then, an empty screen, on which nothing is displayed, as shown in Figure 7(a), is converted into an AV screen, on which the video title is reproduced, as shown in Figure 7(b). If the user presses the Content Info 50 on the remote controller 400, the reproducing apparatus downloads a reproducing control file and a markup document from the outside and recognizes as if the files DVD_ENAV.IFO and INDEX.XML exist for the video title so that reproducing is performed in a interactive mode. The reproducing control file and the markup document for the interactive mode may be downloaded in various orders. Consequently, an AV screen and a markup document screen are simultaneously displayed in the interactive mode, as shown in Figure 7(c).

[0039] The following is an example of the file INDEX.XML that is downloaded from the Internet.

```

25  <?xml version="1.0"?>
    <!DOCTYPE      html      PUBLIC      -//DVD//DTD      XHTML      DVD-HTML      1.0//EN
    "http://www.dvdforum.org/enav/dtd/dvdhtml-1-0.dtd">
30  <html>
    <head>
    <title> startup markup document</title>
    <link rel="stylesheet" type="text/css" href="starwars.css" />
    <link
35      rel="dvd-xifo"
      type="application/dvd-xifo"
      href="http://www.hollywood.com/starwars2/dvd_enav.ifo" id="xifo"/>
    </head>
    <body background="url(dvd:)">
    <script language="ecmascript">
40  <!--
      dvdVideo.Play();
    -->
    </script>
45  </body>
    </html>

```

50 [0040] In the above source code, <link rel="dvd-xifo" type="application/dvd-xifo" href="http://www.hollywood.com/starwars2/dvd_enav.ifo" id="xifo"/> instructs to read the file DVD_ENAV.IFO, which is stored in a designated universal resource locator (URL), i.e., http://www.hollywood.com/starwars2/dvd_enav.ifo, and reproduce a relevant video title based on the read file DVD_ENAV.IFO.

[0041] Alternatively, instead of a link tag, API as shown below may be used to retrieve a reproducing control file.

55 API for retrieving the reproducing control file DVD_ENAV.IFO:
 dvdvideo.Play("dvd://dvd_enav/dvd_enav.ifo");
 dvdvideo.Play("http://www.hollywood.com/starwars2/dvd_enav.ifo");

[0042] Furthermore, a disc producer can intentionally insert <link rel="dvd-xifo" type="application/dvd-xifo" href="ht-

tp://www.tristar.com/forest2003.ifo"/> into not the file DVD_ENAV.IFO but a markup document within the interactive directory DVD_ENAV on a disc during an authoring process in order to instruct to download a reproducing control file from a particular URL. This method can be used to perform reproducing in the interactive mode by providing a reproducing control file through a producer server apparatus every time.

5 [0043] Furthermore, a markup document, which contains information for linking a new reproducing control file, is recorded on a disc during production of the disc in advance anticipating a new reproducing control configuration, which is to be produced after the production of the disc, so that when a video title and the markup document are simultaneously reproduced in an interactive mode, a new markup document screen having an AV screen, in which the video title is displayed based on the new reproducing control file obtained through the link information recorded on the disc, can be displayed.

10 [0044] Figure 8 is a schematic diagram explaining a method of updating content displayed on an interactive mode reproducing screen. Referring to Figure 8, anchors 81, 82, 83, and 84 are displayed on a markup document screen which is displayed together with an AV screen. It is assumed that a disc is produced in March, 2001. If a user selects the anchor 81 indicating big hits in 1999 or the anchor 82 indicating big hits in 2000, relevant content can be reproduced based on the reproducing control file DVD_ENAV.IFO that is recorded on the disc. However, reproducing control files, which are to be linked to the anchor 83 indicating big hits in 2001 and the anchor 84 indicating big hits in 2002, cannot be created when the disc is produced because a reproducing control configuration to be used in the future cannot be estimated. In this case, a disc producer can make the anchors 83 and 84 in advance and puts new reproducing control files into a server apparatus of a relevant URL so that an AV screen embedded in a markup document screen can be updated by reproducing a relevant video title based on the new reproducing control files. In addition, information indicating whether a reproducing control file has been made for the purpose of reproducing control may be embedded into the reproducing control file in order to allow a reproducing apparatus to determine whether the downloaded file is to be used for reproducing control or as text data information. In other words, when a user selects the anchor 83 or 84, just text data can be read but an interactive mode screen is not displayed until the file linked to the URL is determined as a reproducing control file. After a file, which contains new reproducing control information instructing reproducing control, is put into the server apparatus of the URL, content complying with the new reproducing control configuration can be displayed.

[0045] The following description concerns a reproducing method according to a preferred embodiment of the present invention based on the above structure.

30 [0046] Figure 9 is a flowchart of a reproducing method according to an embodiment of the present invention. Referring to Figure 9, if a user inserts the disc 100 of Figure 2 into a disc deck provided in the reproducing apparatus 200, the presentation engine 5 checks to determine whether information, which is necessary for performing reproducing in an interactive mode, that is, a reproducing control file and a markup document have been recorded on the disc 100 in step 901. If it is determined that the reproducing control file and the markup document have been recorded on the disc 100 in step 902, they are read to reproduce a relevant video title in an interactive mode in step 903. If it is determined that the reproducing control file and the markup document have not been recorded on the disc 100 in step 902, the network data transceiver 6 downloads the reproducing control file and the markup document from the Internet and stores them in the cache memory 3 in step 904. A disc identifier or video title identifier, which is recorded on the disc 100 in order to identify a disc or video title, is used as a key value for downloading the reproducing control file and the markup document for a particular video title. The presentation engine 5 reproduces the video title in an interactive mode, using the reproducing control file and the markup document stored in the cache memory 3, in step 905.

45 [0047] Figure 10 is a flowchart of a reproducing method according to another embodiment of the present invention. Referring to Figure 10, a user inserts an interactive DVD or a conventional DVD-video into the reproducing apparatus 200 in step 1001. The reproducing apparatus 200 checks the disc to determine whether the disc is an interactive DVD or a conventional DVD-video in step 1002. If it is determined that the disc is an interactive DVD in step 1003, information for reproducing in an interactive mode, which is composed of a reproducing control file DVD_ENAV.IFO and an initial startup markup document INDEX.XML, is read from the disc so as to reproduce a relevant video title in an interactive mode in step 1004. If it is determined that the disc is a conventional DVD-video in step 1003, and if the interactive mode is not selected in step 1005, the video title is reproduced in a video mode in step 1006.

50 [0048] If it is determined that the disc is a conventional DVD-video in step 1003, and if the interactive mode is selected, for example, if the user presses the Content Info 50 provided on the remote controller 400 in step 1005, the reproducing apparatus 200 accesses a predetermined interactive server apparatus through Internet, using the network data transceiver 6, and downloads a predetermined markup document from the Internet in step 1007. The downloaded markup document contains a client execution code for recognizing a disc identifier of the DVD-video inserted into the reproducing apparatus 200 or a video title identifier (e.g., ISRC) of a video title desired to be reproduced. The client execution code is a source code in script language. However, the client execution code may be composed in another program language which can be executed in the presentation engine 5. Here, the disc identifier or the video title identifier is recorded in a file VIDEO_TS.IFO. The client execution code is executed in the presentation engine 5 so that the disc

identifier or the video title identifier is read, and the network data transceiver 6 transmits the identifier to the interactive server apparatus in step 1008. The interactive server apparatus transmits a markup document, which has a similar function to a markup document INDEX.XML for downloading a new reproducing control file corresponding to the identifier, to the network data transceiver 6 in step 1009. The markup document is linked to the reproducing control file through a link tag or contains an execution code using API for downloading the reproducing control file. The reproducing control file is downloaded in step 1010. Here, the reproducing control file must contain information indicating the reproducing control file is made for the purpose of reproducing control. In the meantime, the reproducing control file may contain URL information, which indicates the location of a new markup document that is necessary for reproducing the video title in the interactive mode. That is, the reproducing control file may designate the location of the initial startup markup document INDEX.XML. The presentation engine 5 analyzes the downloaded reproducing control file, receives the new markup document necessary for reproducing in the interactive mode, and reproduces the video title and the markup document in the interactive mode in step 1011. The steps 1007 and 1008 may be combined into a single step, which is followed by the step 1009. For example, the network data transceiver 6 can transmit the disc identifier or the video title identifier to the interactive server apparatus, and the interactive server apparatus can immediately transmit the markup document for downloading the reproducing control file to the reproducing apparatus 200 in response to the identifier.

[0049] In the above embodiments, content recorded on a disc is a video title. However, the present invention can also be applied to other various types of contents such as audio titles and electronic books.

[0050] As described above, according to the present invention, even if information for reproducing content in an interactive mode is not recorded on a disc, the content can be reproduced in the interactive mode. In addition, by modifying and updating a reproducing control file and a markup document which are stored in a server apparatus, a content provider can provide the latest information and allow content to be reproduced in a new format. Furthermore, since link information concerning a new reproducing control file which will be provided in the future is recorded on a disc in advance, content recorded on the disc can be reproduced based on the new reproducing control file so that content of an interactive screen can be updated.

[0051] The reader's attention is directed to all papers and documents which are filed concurrently with or previous to this specification in connection with this application and which are open to public inspection with this specification, and the contents of all such papers and documents are incorporated herein by reference.

[0052] All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

[0053] Each feature disclosed in this specification (including any accompanying claims, abstract and drawings), may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

[0054] The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any novel one, or any novel combination, of the features disclosed in this specification (including any accompanying claims, abstract and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.

Claims

1. A method of reproducing content from an information storage medium in an interactive mode, the method comprising the steps of:

(a) receiving information, which is necessary for reproducing the content in the interactive mode, from Internet; and

(b) reproducing the content in the interactive mode based on the received information.

2. The method of claim 1, wherein the step (a) comprises receiving the information from the internet or reading the information from the information storage medium, or a combination of both, and the step (b) comprises reproducing the content based on the received and/or read information.

3. The method of claim 2, wherein the step (a) comprises the steps of:

(a1) determining whether the information for reproducing the content in the interactive mode has been recorded

on the information storage medium; and

(a2) requesting and receiving the information from a predetermined server apparatus when it is determined that the information has not been recorded on the information storage medium.

4. The method of claim 3, wherein the step (a2) comprises the steps of:

(a21) transmitting an identifier of the content to the server apparatus; and

(a22) receiving at least one among a reproducing control file and a markup document, which correspond to the identifier, from the server apparatus.

5. The method of claim 4, wherein the information storage medium stores a markup document that contains information instructing to download a reproducing control file from the server apparatus so that an interactive screen is updated whenever the reproducing control file in the server apparatus is updated.

6. The method of claim 5, wherein a markup document that contains information for linking a new reproducing control file is recorded in the information storage medium during production of the information storage medium in advance anticipating a new reproducing control configuration, which is to be produced after the production of the information storage medium, so that a new interactive screen can be displayed when a video title recorded in the information storage medium is reproduced together with the markup document in the interactive mode.

7. The method of claim 1, wherein the step (a) comprises requesting and receiving the information from the internet.

8. The method of claim 7, wherein the content is a video title, and the information storage medium is a disc.

9. The method of claim 8, wherein the step (a) comprises the step of (a1) requesting and receiving a reproducing control file and a markup document, which are necessary for reproducing the video title in the interactive mode.

10. The method of claim 9, wherein the step (a1) comprises the steps of:

(a11) transmitting an identifier of the video title to the server apparatus; and

(a12) receiving at least one among the reproducing control file and the markup document, which correspond to the identifier.

11. The method of claim 10, wherein the step (a12) comprises receiving a markup document, which contains a client execution code for recognizing the identifier of the video title, from the server apparatus.

12. The method of claim 11, wherein the step (a12) comprises the steps of:

(a121) receiving the markup document for downloading the reproducing control file; and

(a122) receiving the reproducing control file that is

13. The method of claim 12, wherein the markup document received in step (a121) contains either a link tag that is linked to the reproducing control file or an execution code that calls application program interface (API) for retrieving the reproducing control file.

14. The method of claim 13, wherein the link tag is used to retrieve text data.

15. The method of claim 14, wherein the text data, which has the same identifier code as text data desired to be found using the link tag, is retrieved, or text data, which is recorded at an n-th place either before or behind a position of previously found text data, is retrieved.

16. The method of claim 13, 14 or 15, wherein the reproducing control file contains designation information designating that the reproducing control file is made for the purpose of reproducing control.

17. The method of claim 16, wherein it is determined whether the received reproducing control file is to be used for reproducing control or used as text data information based on the designation information.

18. The method of claim 16 or 17, wherein the received reproducing control file is used for reading text data until it is determined that the reproducing control file is made for the purpose of reproducing control based on the designation information.

19. An apparatus for reproducing content from an information storage medium (100) in an interactive mode, the apparatus comprising:

a network data transceiver (16) that receives information, which is necessary for reproducing the content in the interactive mode, from the outside through Internet, wherein the apparatus reproduces the content in the interactive mode using the information received through the network data transceiver (6).

20. The apparatus of claim 19, wherein the apparatus comprises:

a reader (1) that reads the content from the information storage medium; and

a decoder (4) that decodes the read content;

wherein the apparatus reproduces the content in the interactive mode using a combination of the content read from the information storage medium and/or the information received through the network data transceiver (6).

21. The apparatus of claim 20, wherein the information necessary for reproducing in the interactive mode comprises a reproducing control file for reproducing the content and a markup document that is displayed together with the content, and the apparatus further comprises:

a presentation engine (5) that analyzes the reproducing control file and the markup document to perform or reproduce them; and

a blender (7) that blends the decoded content and the reproduced markup document.

22. The apparatus of claim 20 or 21, wherein the network data transceiver (6) transmits an identifier of the content to a server apparatus and receives interactive content corresponding to the identifier from the server apparatus.

23. The apparatus of claim 22, wherein the information storage medium stores a markup document, which contains information instructing to download the reproducing control file from the server apparatus, so that an interactive screen is updated whenever the reproducing control file is updated in the server apparatus.

24. The apparatus of claim 23, wherein a markup document that contains information for linking a new reproducing control file is recorded in the information storage medium during production of the information storage medium in advance anticipating a new reproducing control configuration, which is to be produced after the production of the information storage medium, so that a new interactive screen can be displayed when a video title recorded in the information storage medium is reproduced together with the markup document in the interactive mode.

25. The apparatus of claim 19, wherein the content is a video title and the information storage medium is a disc, and the network data transceiver (6) requests and receives the information, which is necessary for reproducing the video title in the interactive mode, from the internet, and the video title is reproduced in the interactive mode based on the received information.

26. The apparatus of claim 25, wherein the network data transceiver (6) requests and receives a reproducing control file and a markup document, which are necessary for reproducing the video title in the interactive mode, from a server apparatus.

27. The apparatus of claim 25 or 26, wherein the network data transceiver (6) transmits an identifier of the video title to the server apparatus and receives the reproducing control file and the markup document which correspond to the identifier.

28. The apparatus of claim 25, 26 or 27, wherein the network data transceiver (6) receives a markup document, which

contains a client execution code for recognizing the identifier of the video title, from the server apparatus.

5 29. The apparatus of claim 28, wherein the network data transceiver (6) receives the markup document for downloading the reproducing control file and receives the reproducing control file that is linked to the received markup document, and an initial startup markup document is set in the received reproducing control file.

10 30. The apparatus of claim 29, wherein the received markup document contains either a link tag that is linked to the reproducing control file or an execution code that calls application program interface (API) for retrieving the reproducing control file.

31. The apparatus of claim 30, wherein the link tag is used to retrieve text data.

15 32. The apparatus of claim 31, wherein the text data, which has the same identifier code as text data desired to be found using the link tag, is retrieved, or text data, which is recorded at an n-th place either before or behind a position of previously found text data, is retrieved.

33. The apparatus of claim 30, 31 or 32, wherein the reproducing control file contains designation information designating that the reproducing control file is made for the purpose of reproducing control.

20 34. The apparatus of claim 33, wherein it is determined whether the received reproducing control file is to be used for reproducing control or used as text data information based on the designation information.

25 35. The apparatus of claim 34, wherein the received reproducing control file is used for reading text data until it is determined that the reproducing control file is made for the purpose of reproducing control based on the designation information.

FIG. 1

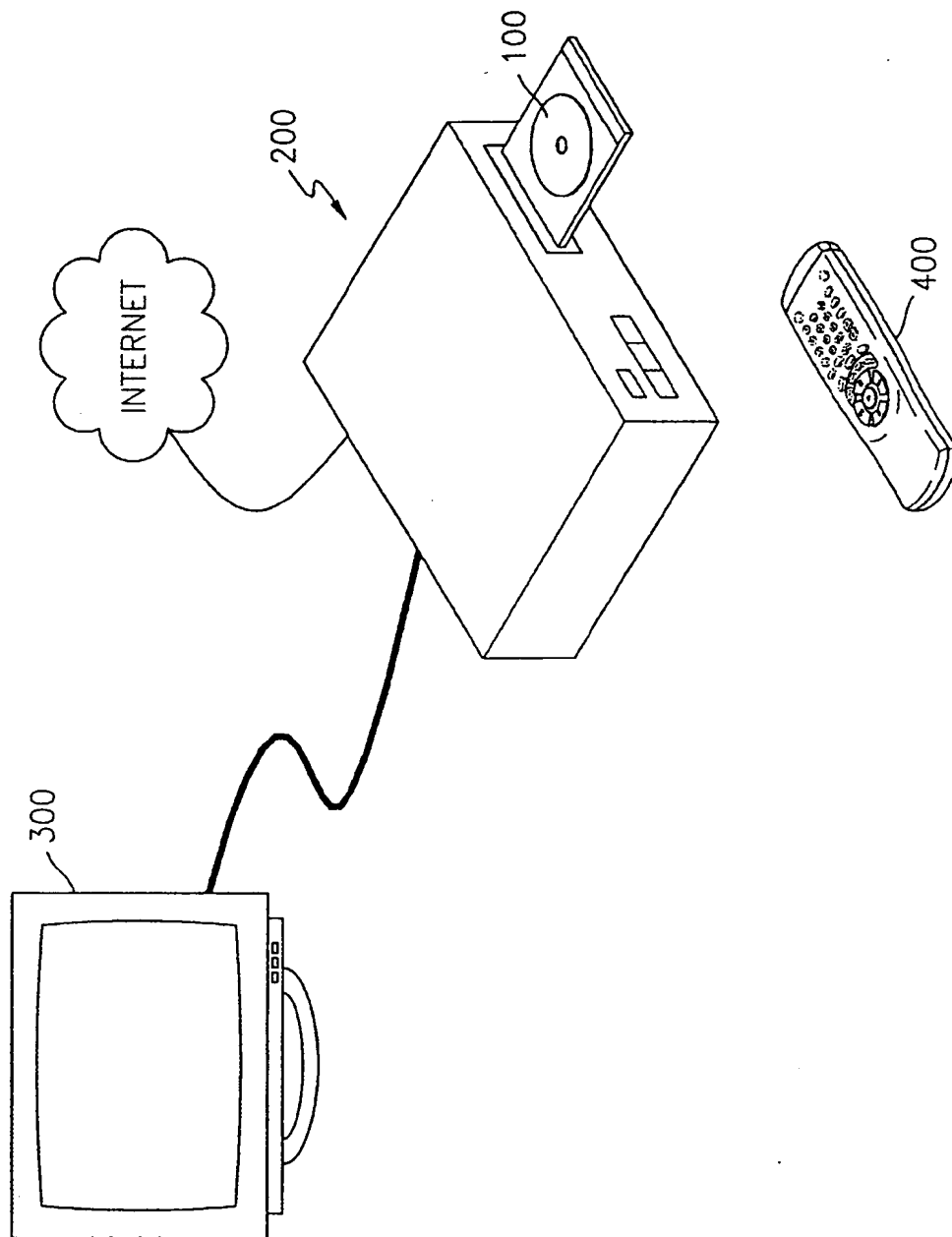


FIG. 2

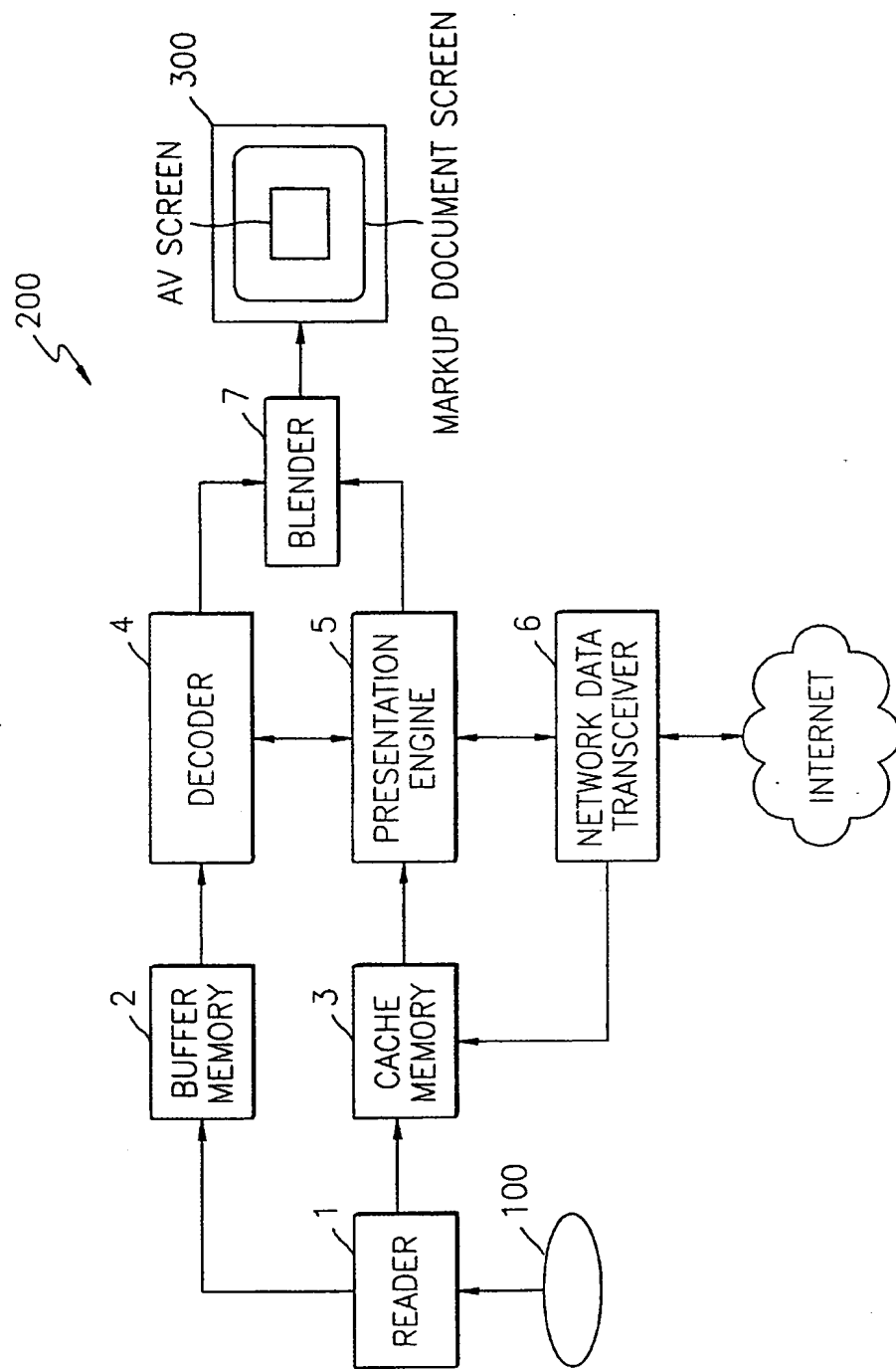


FIG. 3

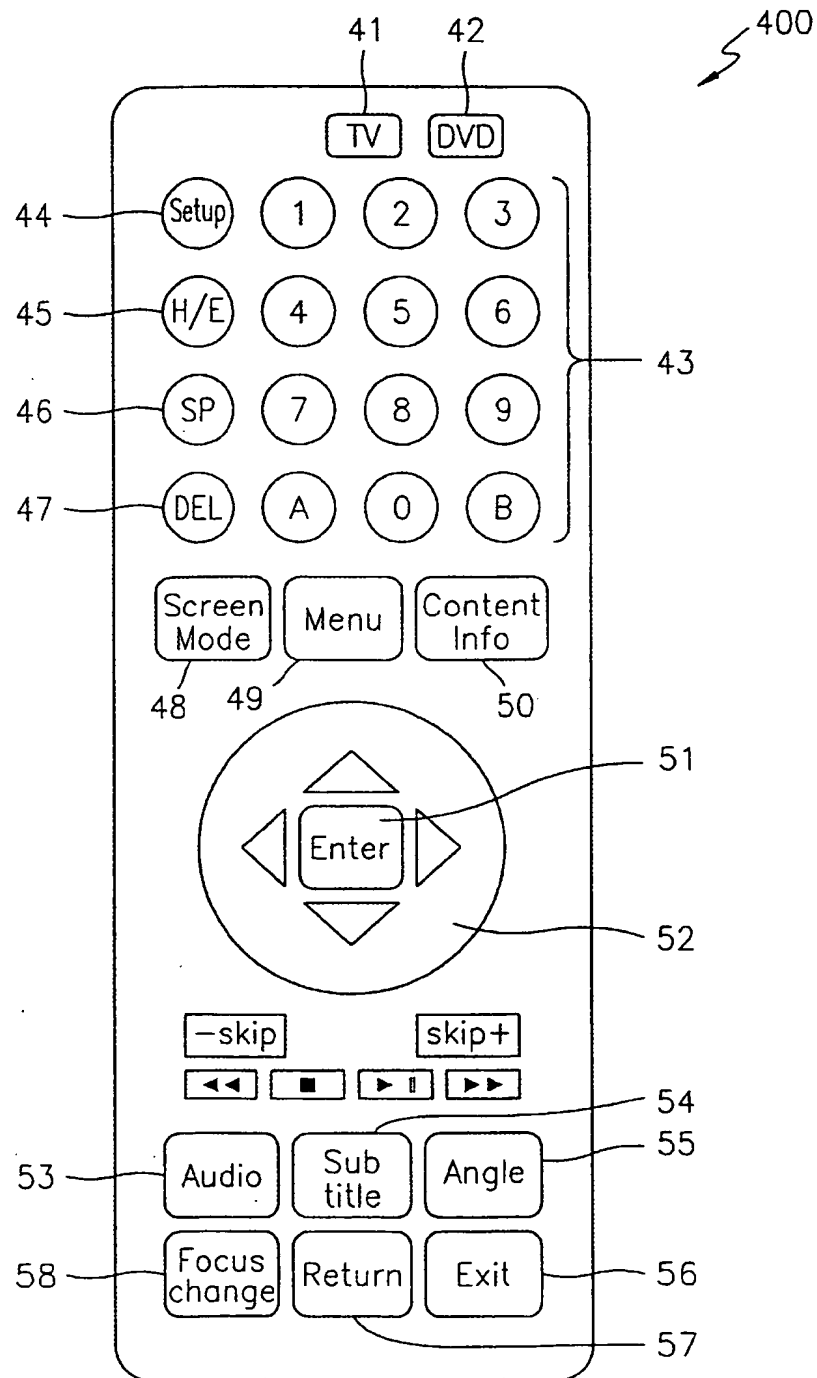


FIG. 4

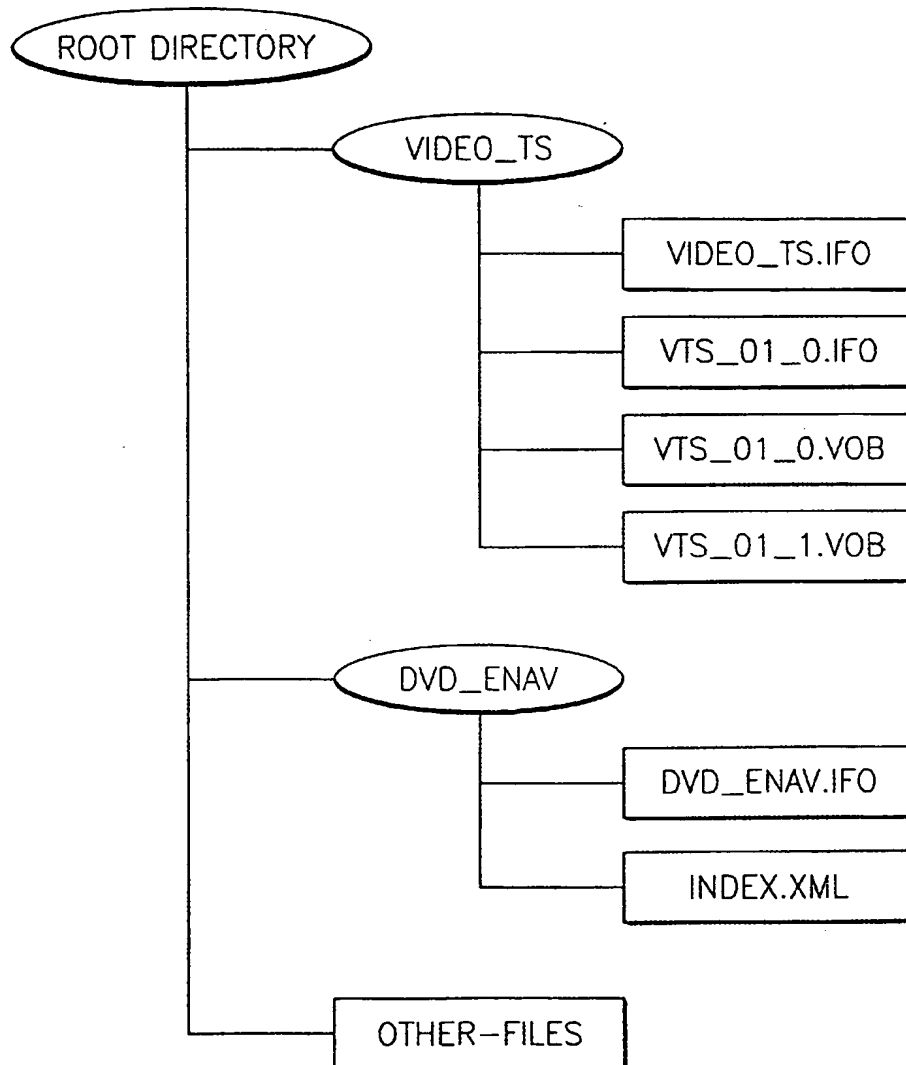


FIG. 5

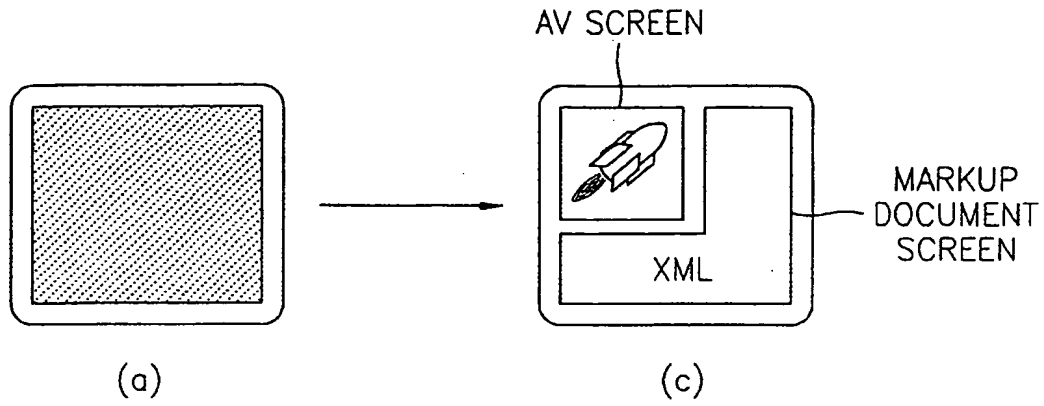


FIG. 6

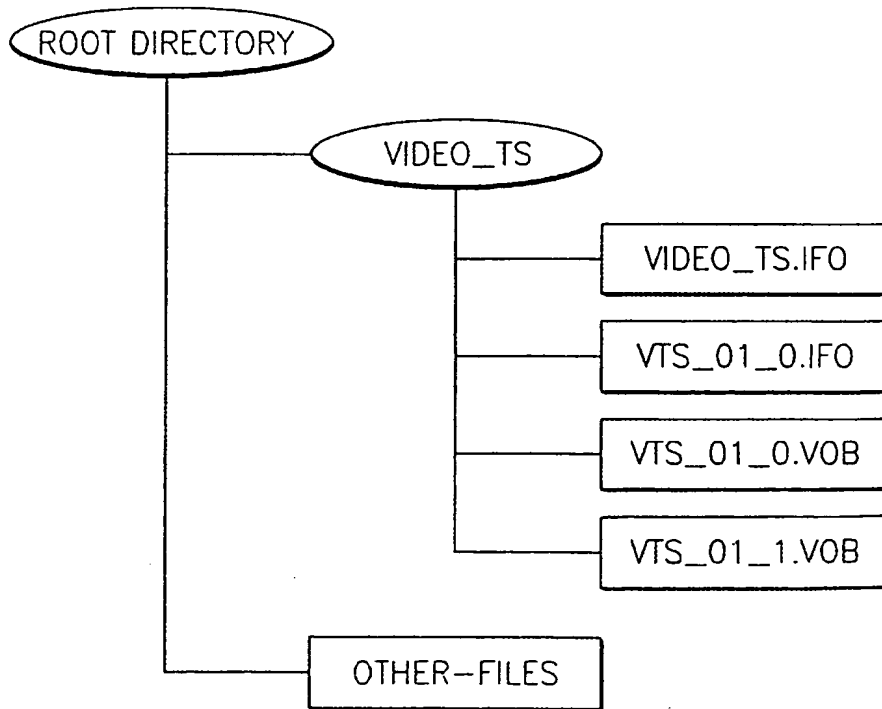


FIG. 7

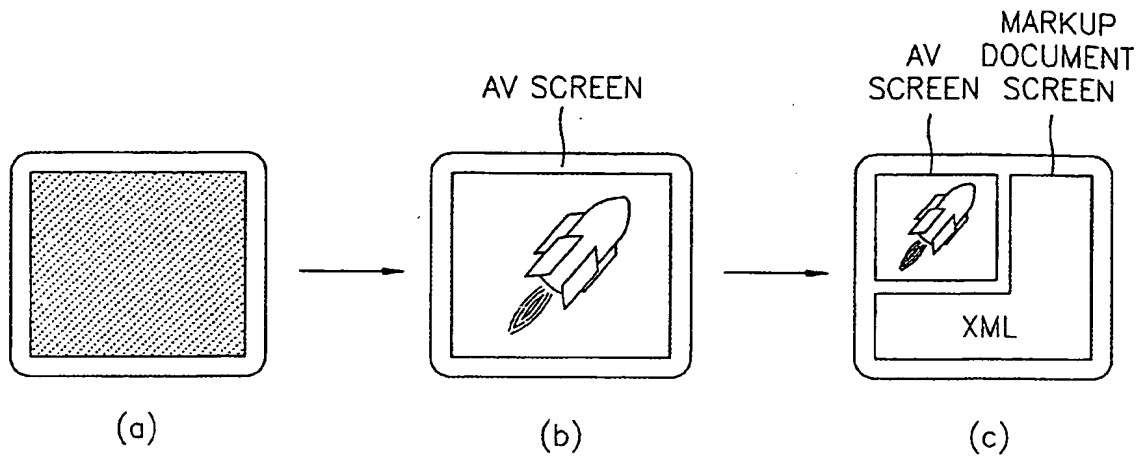


FIG. 8

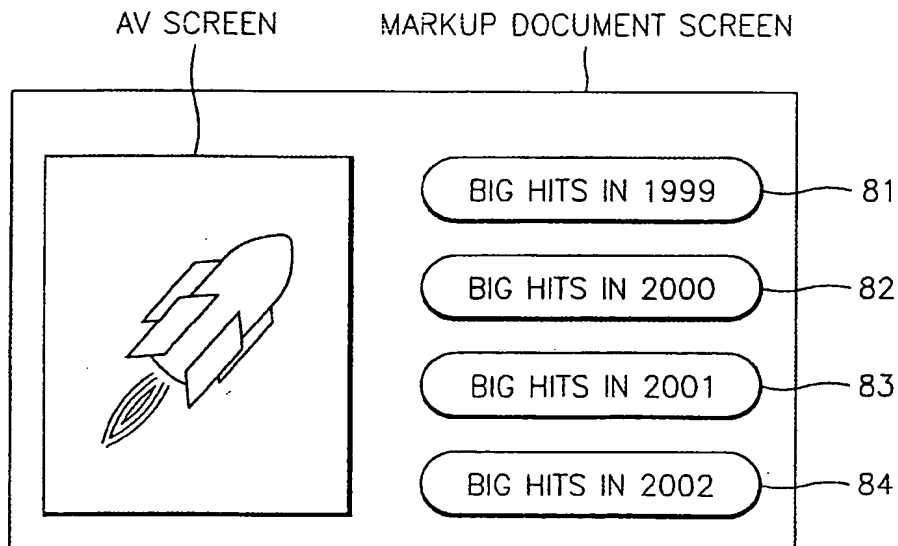


FIG. 9

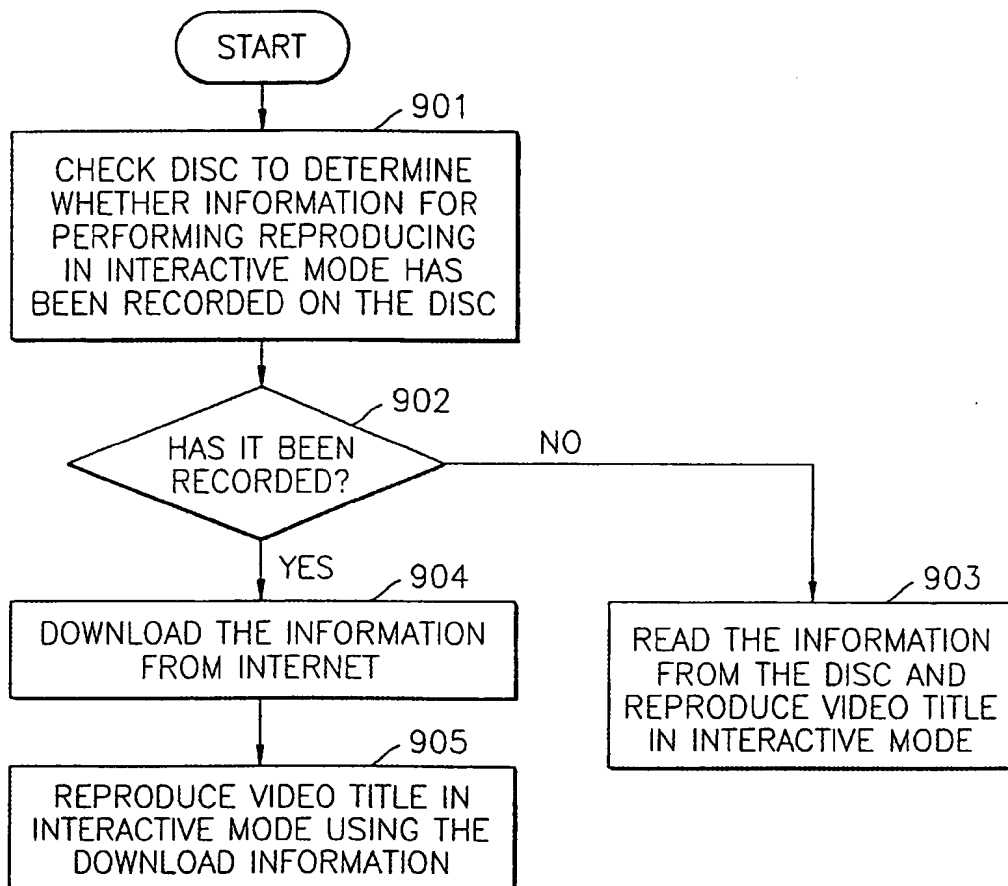
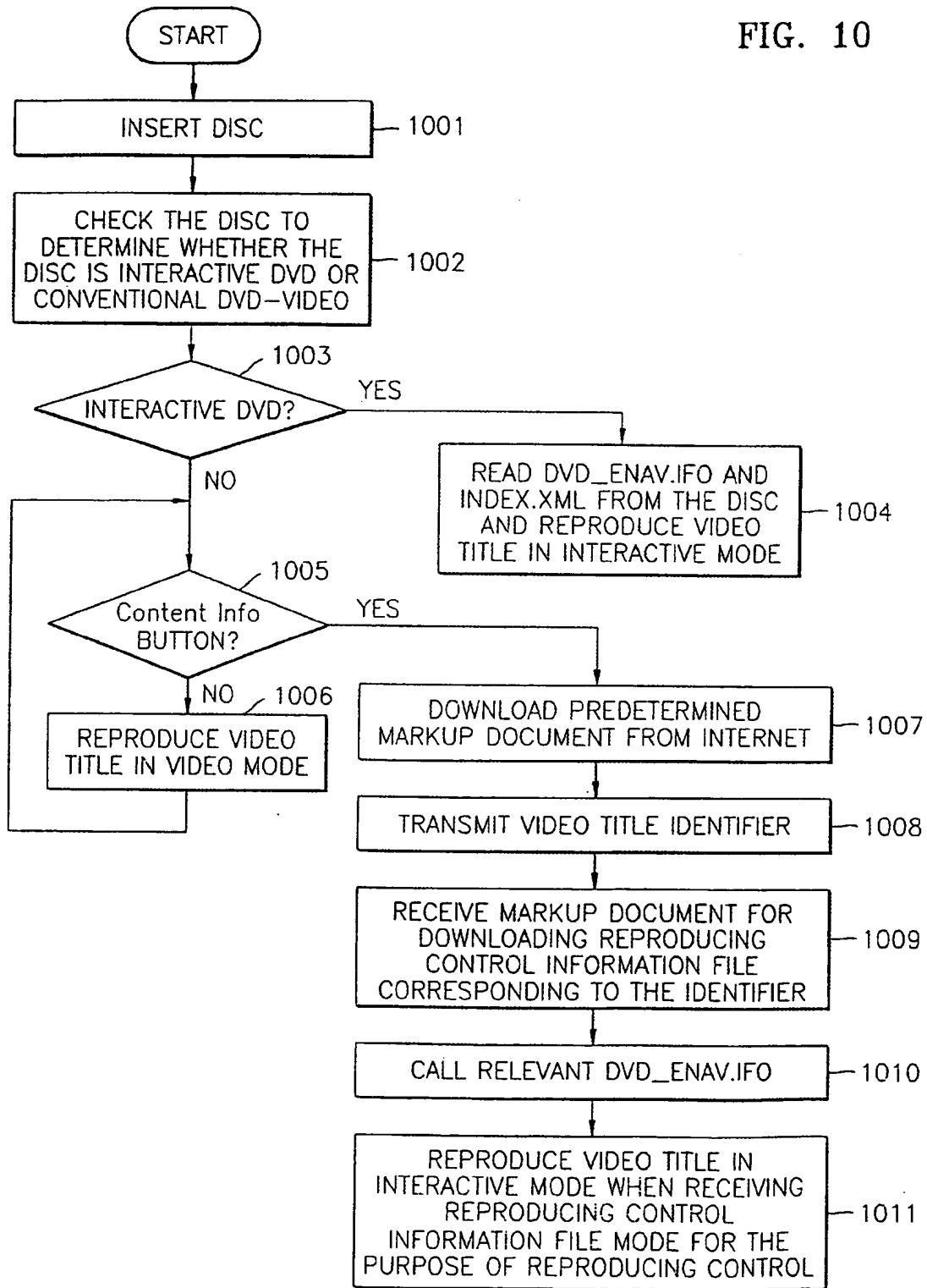


FIG. 10





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 25 7316

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	WO 00 63915 A (SPRUCE TECHNOLOGIES INC) 26 October 2000 (2000-10-26) * abstract; figures 1-3 * * page 2, line 20 - page 5, line 13 * ---	1-35	G11B27/10
X	EP 0 762 422 A (HITACHI LTD) 12 March 1997 (1997-03-12) * column 18, line 40 - column 19, line 8; figure 23 * * column 23, line 15 - line 37 * ---	1-35	
X	US 6 047 292 A (KELLY ROBERT L ET AL) 4 April 2000 (2000-04-04) * column 4, line 46 - column 6, line 26; figures 6-8 * ---	1-35	
X	EP 0 886 276 A (PIONEER ELECTRONIC CORP) 23 December 1998 (1998-12-23) * column 22, line 11 - column 24, line 31; figures 6,7 * -----	1,19	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			G11B G06F H04N
Place of search	Date of completion of the search	Examiner	
MUNICH	13 January 2003	Schinnerl, A	
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons</p> <p>& : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03.02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 02 25 7316

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

13-01-2003

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
WO 0063915	A	26-10-2000	AU	4245300 A	02-11-2000
			EP	1171883 A1	16-01-2002
			WO	0063915 A1	26-10-2000

EP 0762422	A	12-03-1997	JP	9128408 A	16-05-1997
			CN	1146119 A	26-03-1997
			EP	0762422 A2	12-03-1997
			US	5909551 A	01-06-1999

US 6047292	A	04-04-2000	NONE		

EP 0886276	A	23-12-1998	JP	11018048 A	22-01-1999
			CA	2241346 A1	20-12-1998
			EP	0886276 A2	23-12-1998
			US	6434326 B1	13-08-2002

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82